



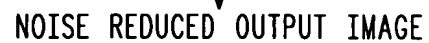
**FIG. 1A**



**FIG. 1B**



**FIG. 2**

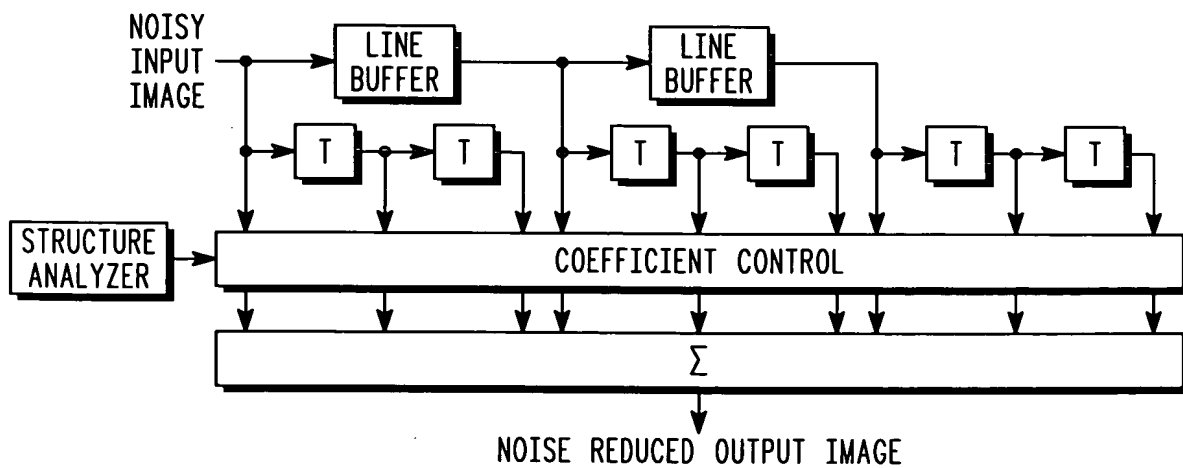


**FIG. 3**

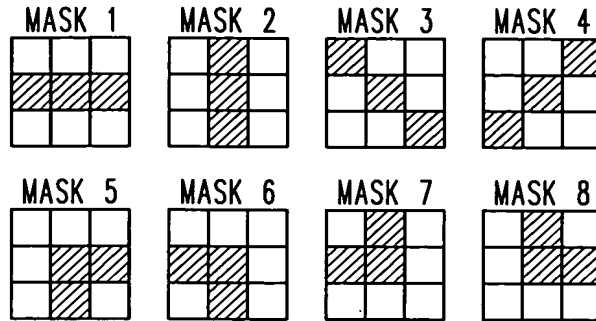
-PRIOR ART-

**FIG. 4**

-PRIOR ART-

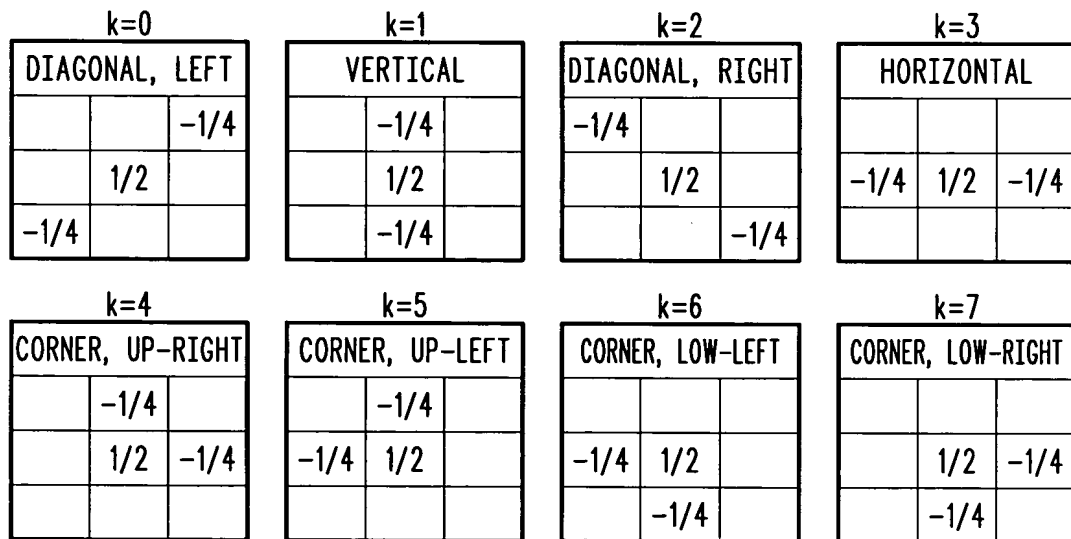


2/21



-PRIOR ART-

**FIG. 5**



**FIG. 6**

	k=[0,3]		k=[0,7]	
MINIMUM DIRECTION	%(4HP)	% (8HP)		MINIMUM DIRECTION
DIAGONAL LEFT (k=0)	48	20	21	CORNER_UR (k=4)
VERTICAL (k=1)	65	26	18	CORNER_UL (k=5)
DIAGONAL RIGHT (k=2)	12	14	21	CORNER_LL (k=6)
HORIZONTAL (k=3)	14	21	19	CORNER_LR (k=7)
TOTAL (4HP)	139		160	TOTAL (8HP)

**FIG. 7**

3/21

$D=[1,4]$

		1
	2	
1		

1	1	
	4	
	1	1

	1	1
1	6	1
1	1	

1	1	1
1	8	1
1	1	1

*FIG. 8A*

$D=[5,8]$

1	2	
2	10	2
	2	1

1	1	1
2	12	2
1	2	1

	3	1
3	14	3
1	3	

1	3	1
3	16	3
1	3	1

*FIG. 8B*

$D=1$

1/4		
	1/2	
		1/4

	1/4	
	1/2	
	1/4	

		1/4
	1/2	
1/4		

1/4	1/2	1/4

$D=2$

1/8	1/8	
	1/2	
	1/8	1/8

1/8		1/8
	1/2	
1/8		1/8

1/8		
1/8	1/2	1/8
		1/8

	1/8	1/8
	1/2	
1/8	1/8	

	1/8	
1/8	1/2	1/8
	1/8	

		1/8
1/8	1/2	1/8
1/8		

$D=3$

1/12	1/12	1/12
	1/2	
1/12	1/12	1/12

1/12	1/12	
1/12	1/2	1/12
	1/12	1/12

	1/12	1/12
1/12	1/2	1/12
1/12	1/12	

1/12		1/12
1/12	1/2	1/12
1/12		1/12

$D=4$

1/16	1/16	1/16
1/16	1/2	1/16
1/16	1/16	1/16

*FIG. 9*

D	COEFFICIENT VALUES FOR NUMBER OF EQUAL DIRECTIONS															N
1	1/2	1/4			3/20			1/10								8
2	1/2	1/4					1/8									28
3	1/2	1/4		1/6						1/12						56
4	1/2		3/16				1/8					1/16				70
5	1/2				3/20			1/10					1/20			56
6	1/2						1/8			1/12				1/24		28
7	1/2							3/28			1/14				1/28	8
8	1/2								3/32						1/32	1

*FIG. 10*

4/21

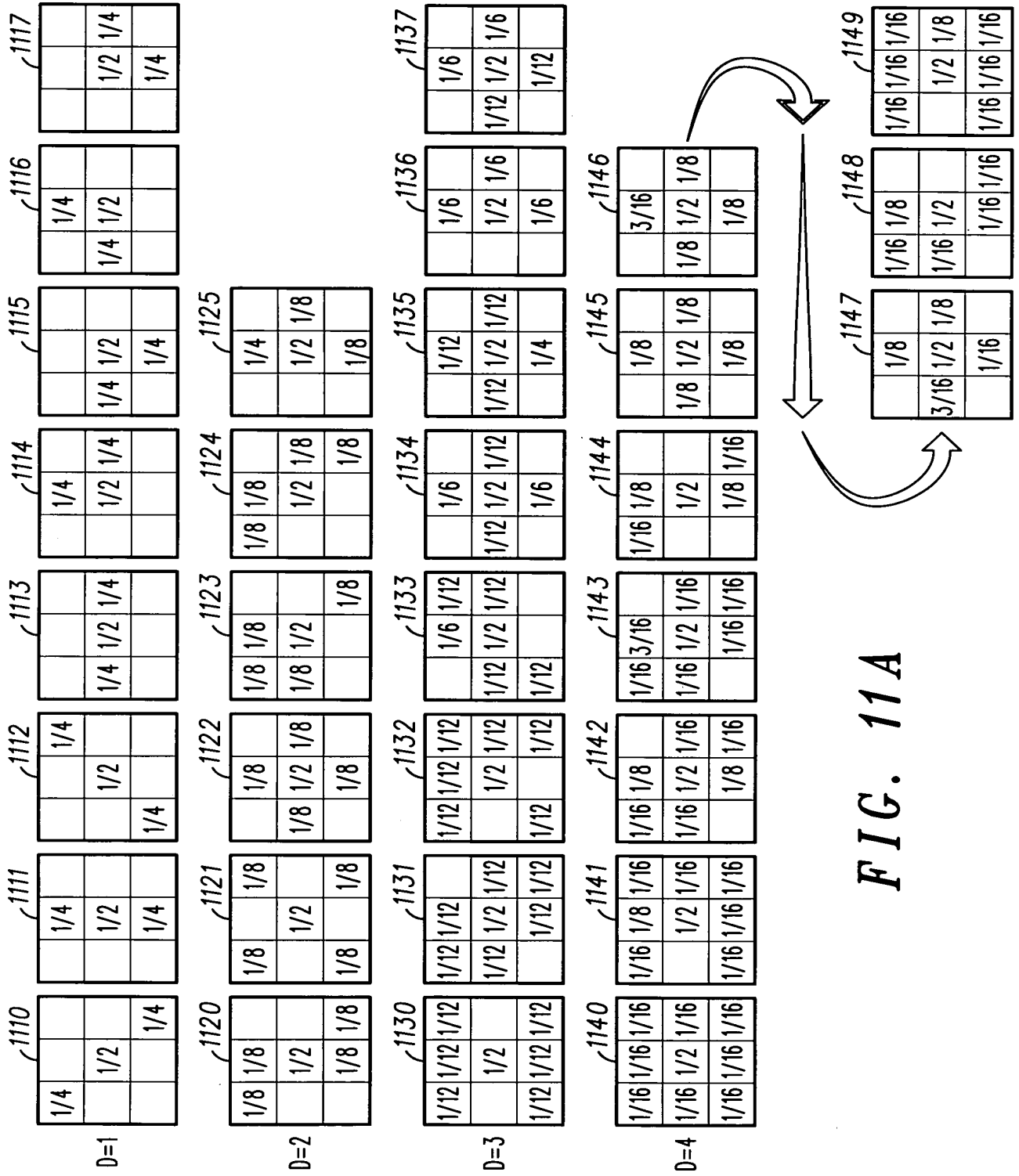


FIG. 11A

5/21

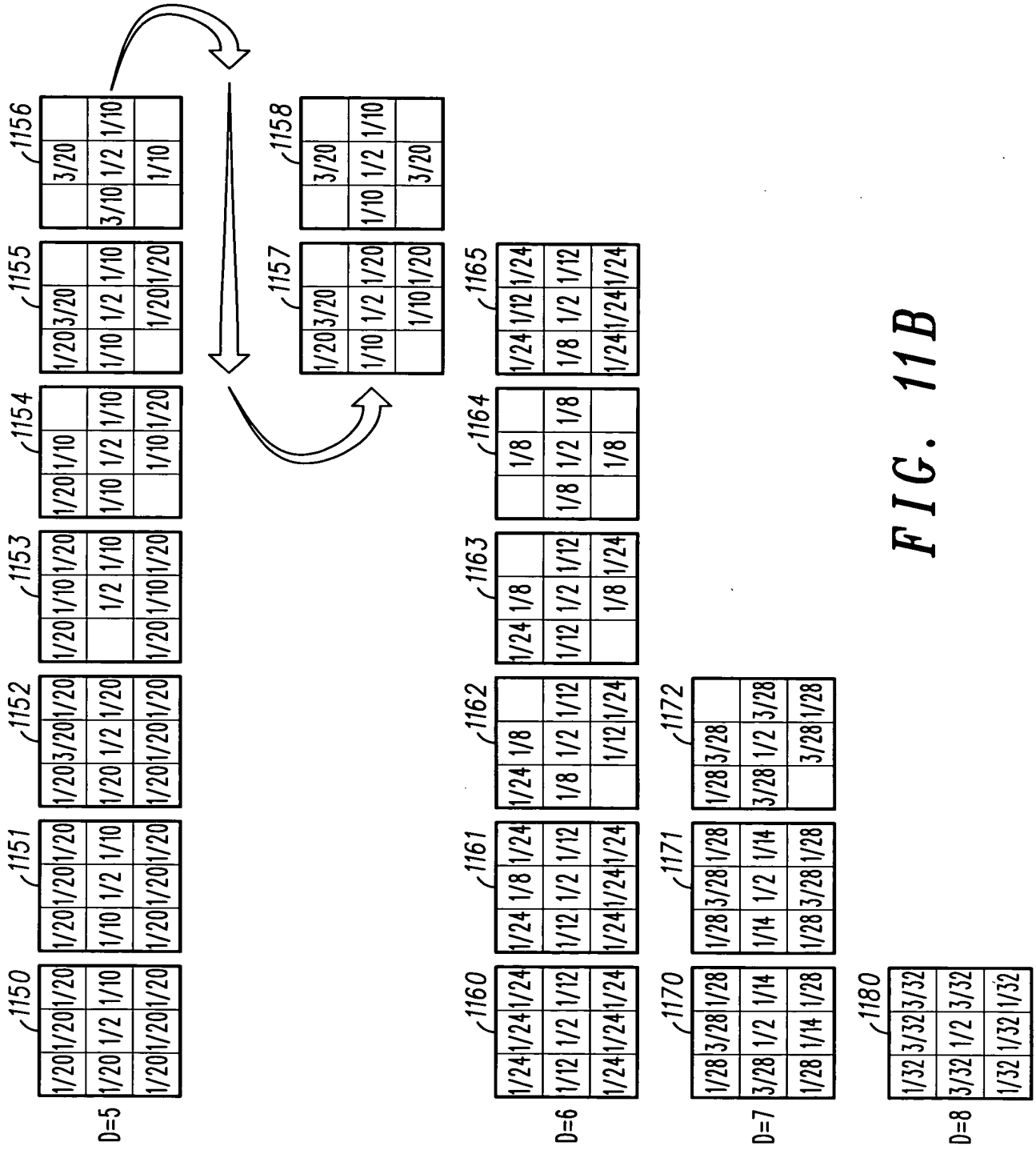
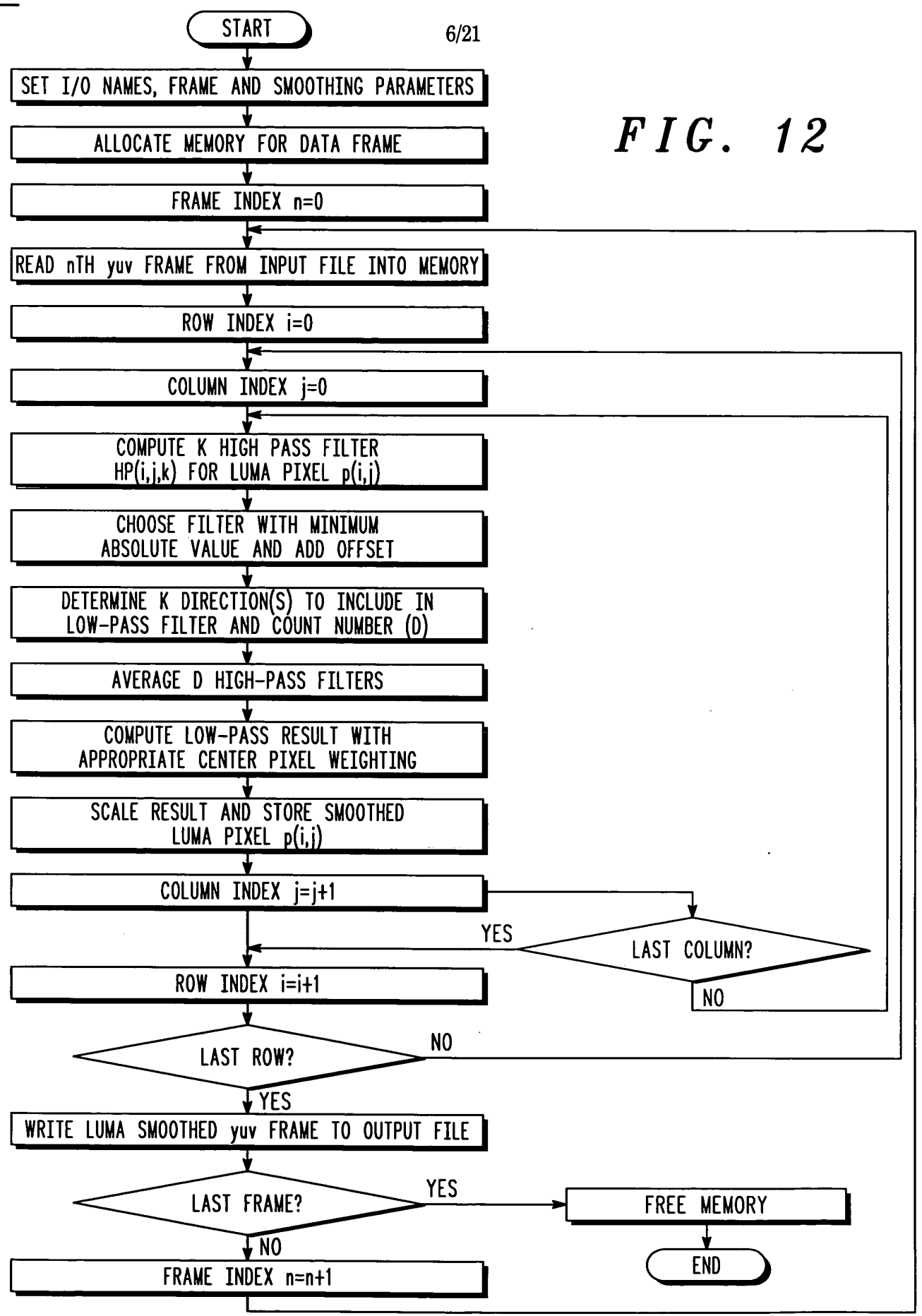


FIG. 11B

6/21

*FIG. 12*



7/21

D=1	D=2	D=3	D=4																																				
<table><tr><td>0</td><td>-1</td><td>0</td></tr><tr><td>0</td><td>2</td><td>0</td></tr><tr><td>0</td><td>-1</td><td>0</td></tr></table>	0	-1	0	0	2	0	0	-1	0	<table><tr><td>0</td><td>-1</td><td>0</td></tr><tr><td>-1</td><td>-4</td><td>-1</td></tr><tr><td>0</td><td>-1</td><td>0</td></tr></table>	0	-1	0	-1	-4	-1	0	-1	0	<table><tr><td>-1</td><td>-1</td><td>0</td></tr><tr><td>-1</td><td>6</td><td>-1</td></tr><tr><td>0</td><td>-1</td><td>-1</td></tr></table>	-1	-1	0	-1	6	-1	0	-1	-1	<table><tr><td>-1</td><td>-1</td><td>-1</td></tr><tr><td>-1</td><td>8</td><td>-1</td></tr><tr><td>-1</td><td>-1</td><td>-1</td></tr></table>	-1	-1	-1	-1	8	-1	-1	-1	-1
0	-1	0																																					
0	2	0																																					
0	-1	0																																					
0	-1	0																																					
-1	-4	-1																																					
0	-1	0																																					
-1	-1	0																																					
-1	6	-1																																					
0	-1	-1																																					
-1	-1	-1																																					
-1	8	-1																																					
-1	-1	-1																																					
<table><tr><td>0</td><td>60</td><td>0</td></tr><tr><td>0</td><td>138</td><td>0</td></tr><tr><td>0</td><td>60</td><td>0</td></tr></table>	0	60	0	0	138	0	0	60	0	<table><tr><td>0</td><td>30</td><td>0</td></tr><tr><td>0</td><td>136</td><td>0</td></tr><tr><td>0</td><td>30</td><td>0</td></tr></table>	0	30	0	0	136	0	0	30	0	<table><tr><td>20</td><td>20</td><td>0</td></tr><tr><td>20</td><td>136</td><td>20</td></tr><tr><td>0</td><td>20</td><td>20</td></tr></table>	20	20	0	20	136	20	0	20	20	<table><tr><td>15</td><td>15</td><td>15</td></tr><tr><td>15</td><td>136</td><td>15</td></tr><tr><td>15</td><td>15</td><td>15</td></tr></table>	15	15	15	15	136	15	15	15	15
0	60	0																																					
0	138	0																																					
0	60	0																																					
0	30	0																																					
0	136	0																																					
0	30	0																																					
20	20	0																																					
20	136	20																																					
0	20	20																																					
15	15	15																																					
15	136	15																																					
15	15	15																																					

FIG. 13

VERTICAL	DIAGONAL LEFT	DIAGONAL RIGHT	HORIZONTAL																																				
<table><tr><td></td><td>-1/4</td><td></td></tr><tr><td></td><td>1/2</td><td></td></tr><tr><td></td><td>-1/4</td><td></td></tr></table>		-1/4			1/2			-1/4		<table><tr><td></td><td></td><td>-1/4</td></tr><tr><td></td><td>1/2</td><td></td></tr><tr><td>-1/4</td><td></td><td></td></tr></table>			-1/4		1/2		-1/4			<table><tr><td>-1/4</td><td></td><td></td></tr><tr><td></td><td>1/2</td><td></td></tr><tr><td></td><td></td><td>-1/4</td></tr></table>	-1/4				1/2				-1/4	<table><tr><td></td><td></td><td></td></tr><tr><td>-1/4</td><td>1/2</td><td>-1/4</td></tr><tr><td></td><td></td><td></td></tr></table>				-1/4	1/2	-1/4			
	-1/4																																						
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	1/2																																						
		-1/4																																					
-1/4	1/2	-1/4																																					

FIG. 14

M1	H	G	F	E	D	C	B	A	UP (ROW i-1)
M2	Q	P	O	N	M	L	K	J	MID (ROW i)
M3	Z	Y	X	W	V	U	T	S	DWN (ROW i+1)

FIG. 15

8/21

	H	G	F	E	D	C	B	A	VERTICAL DIRECTION
	Z	Y	X	W	V	U	T	S	

AVERAGE	$(H+Z)/2$	$(G+Y)/2$	$(F+X)/2$	$(E+W)/2$	$(D+V)/2$	$(H+Z)/2$	$(H+Z)/2$	$(H+Z)/2$
MAXIMUM	Q OR HZ	P OR GY	O OF FX	N OR EW	M OR DV	L OR CU	K OR BT	J OR AS
MINIMUM	Q OR HZ	P OR GY	O OF FX	N OR EW	M OR DV	L OR CU	K OR BT	J OR AS

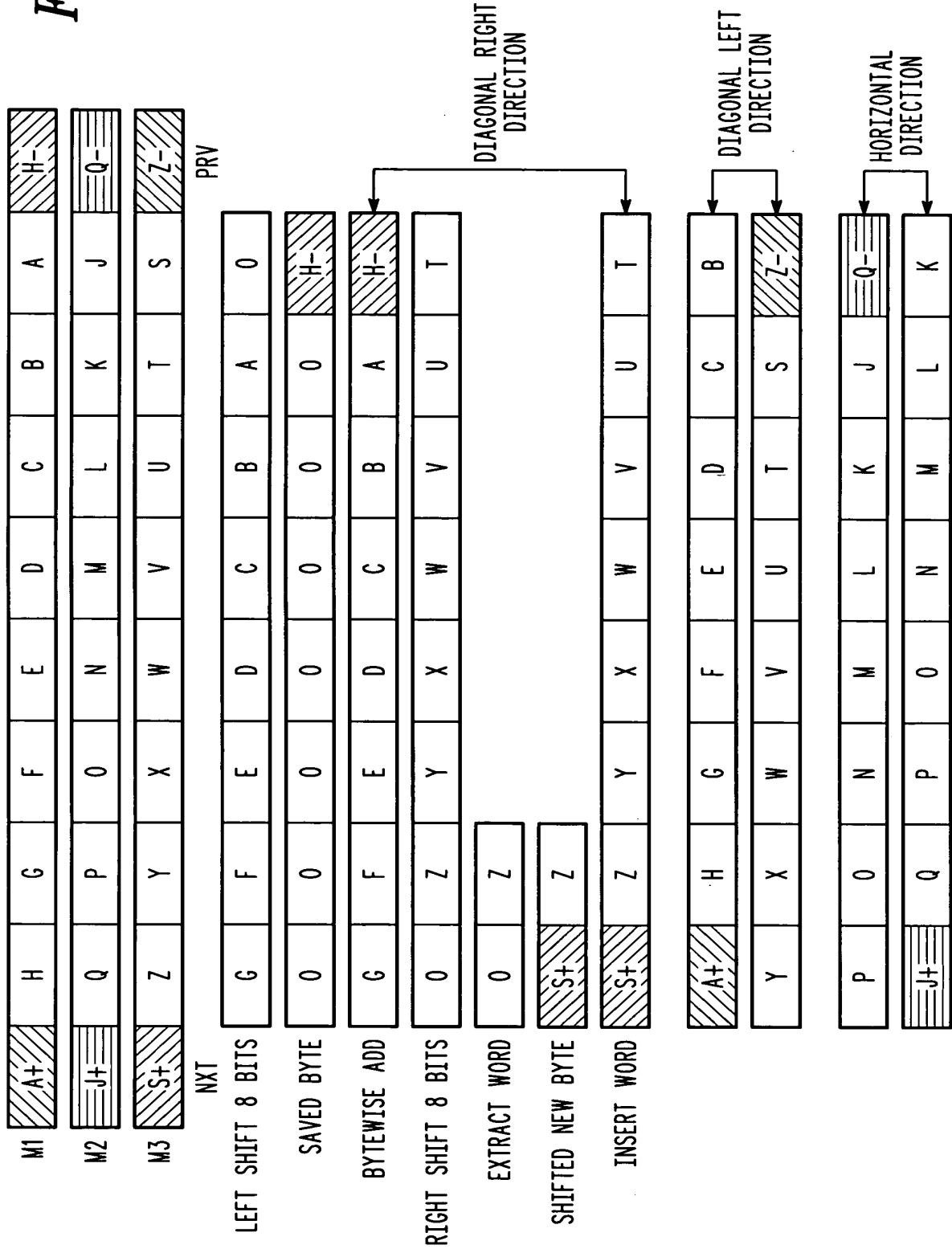
  

MAX-MIN	VABS7	VABS6	VABS5	VABS4	VABS3	VABS2	VABS1	VABS0	ABS(HIGH PASS)
MID-MIN?	VSGN7	VSGN6	VSGN5	VSGN4	VSGN3	VSGN2	VSGN1	VSGN0	SGN(HIGH PASS)

FIG. 16

9/21

FIG. 17



10/21

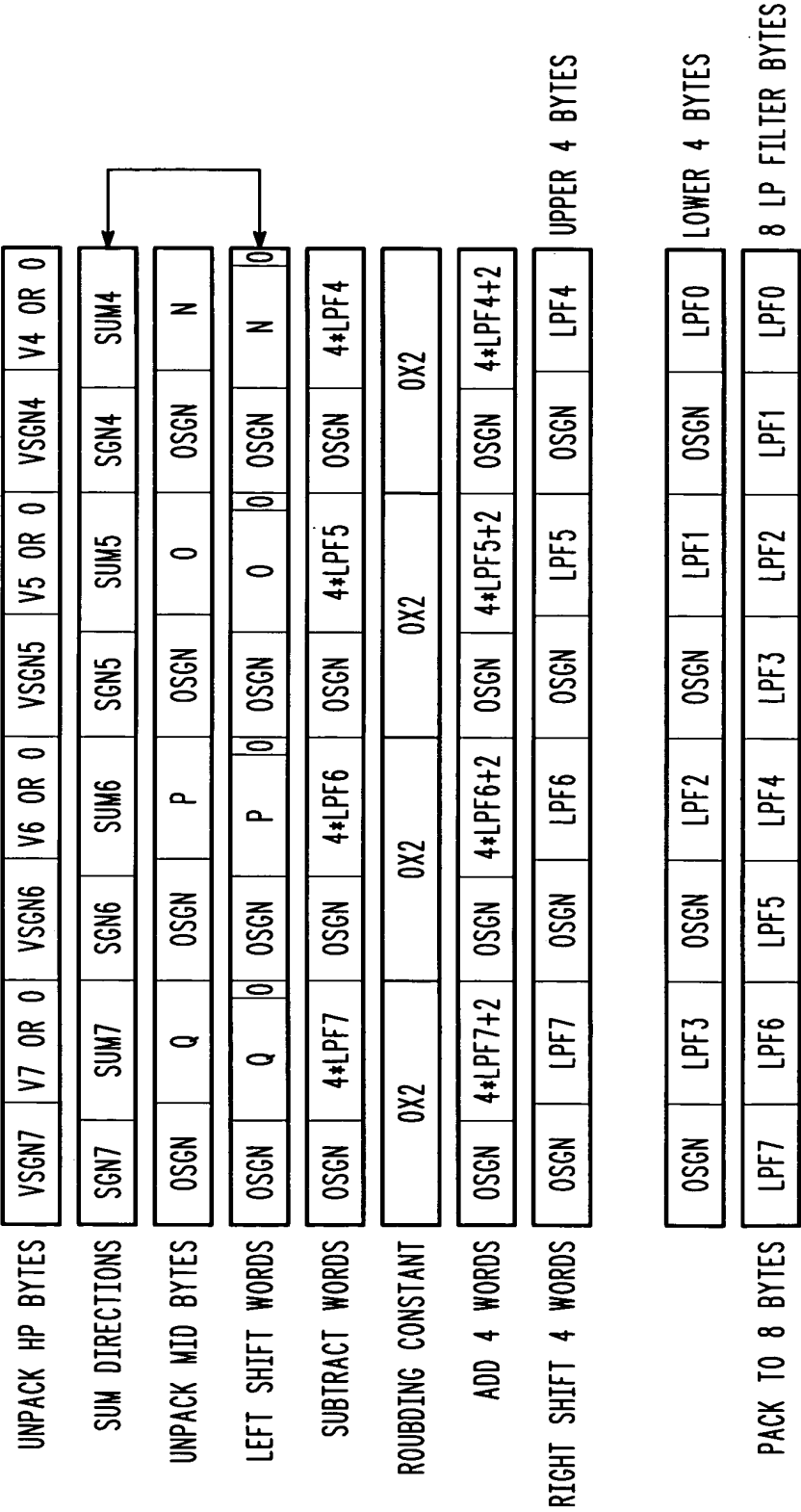
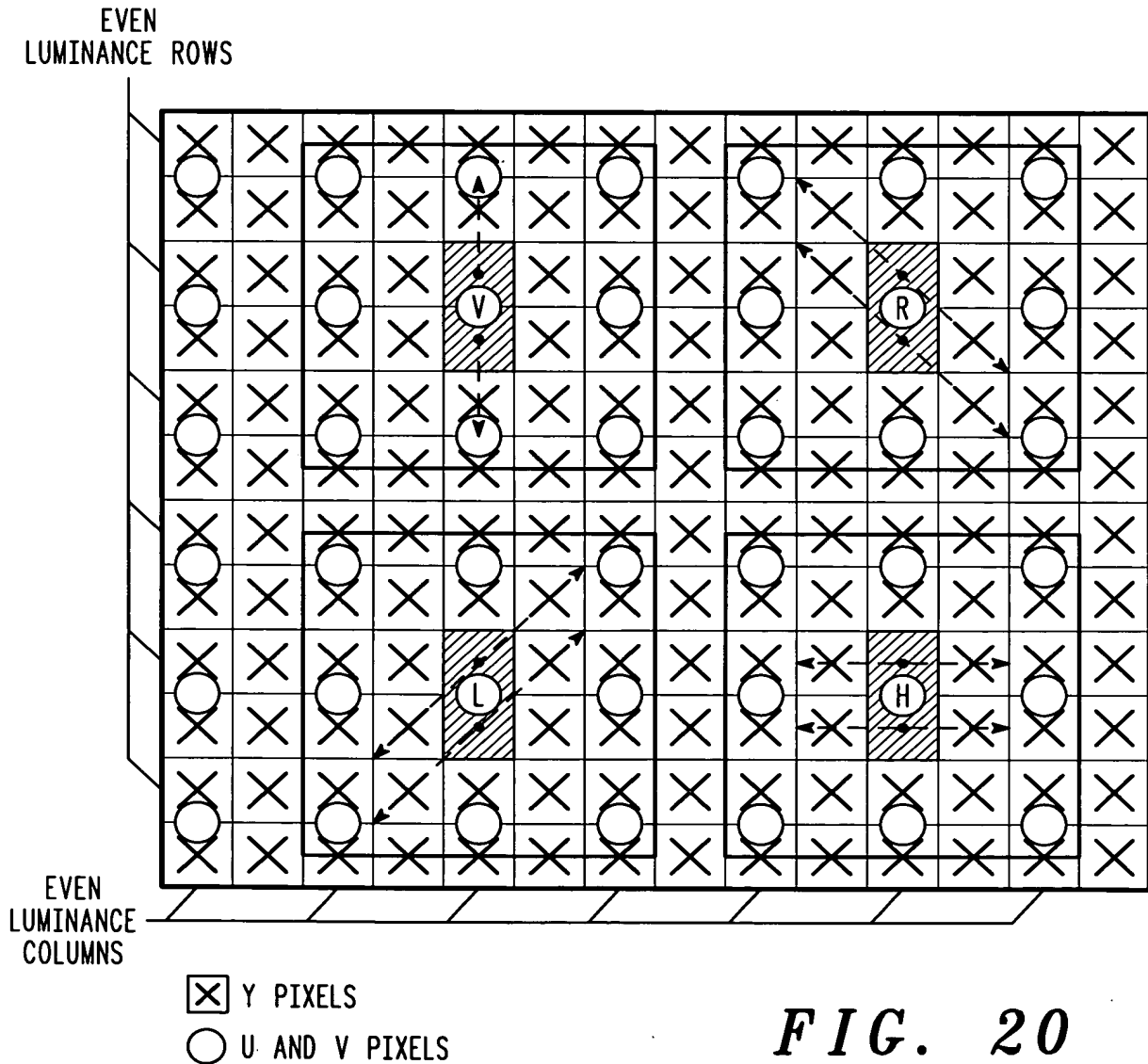


FIG. 18

11/21

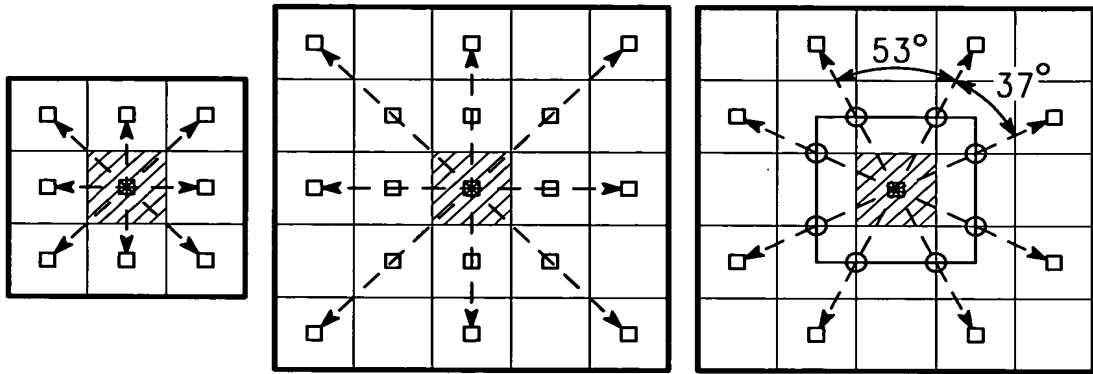
D=1			D=2			D=3			D=4		
HIGH-PASS			HIGH-PASS			HIGH-PASS			HIGH-PASS		
0	-1/2	0	0	-1/2	0	-1/2	-1/2	0	-1/2	-1/2	-1/2
0	1	0	-1/2	2	-1/2	-1/2	3	-1/2	-1/2	4	-1/2
0	-1/2	0	0	-1/2	0	0	-1/2	-1/2	-1/2	-1/2	-1/2
LOW-PASS (75%)			LOW-PASS (50%)			LOW-PASS (25%)			LOW-PASS (0%)		
0	1/8	0	0	1/8	0	1/8	1/8	0	1/8	1/8	1/8
0	3/4	0	1/8	1/2	1/8	1/8	1/4	1/8	1/8	0	1/8
0	1/8	0	0	1/8	0	0	1/8	1/8	1/8	1/8	1/8

*FIG. 19*

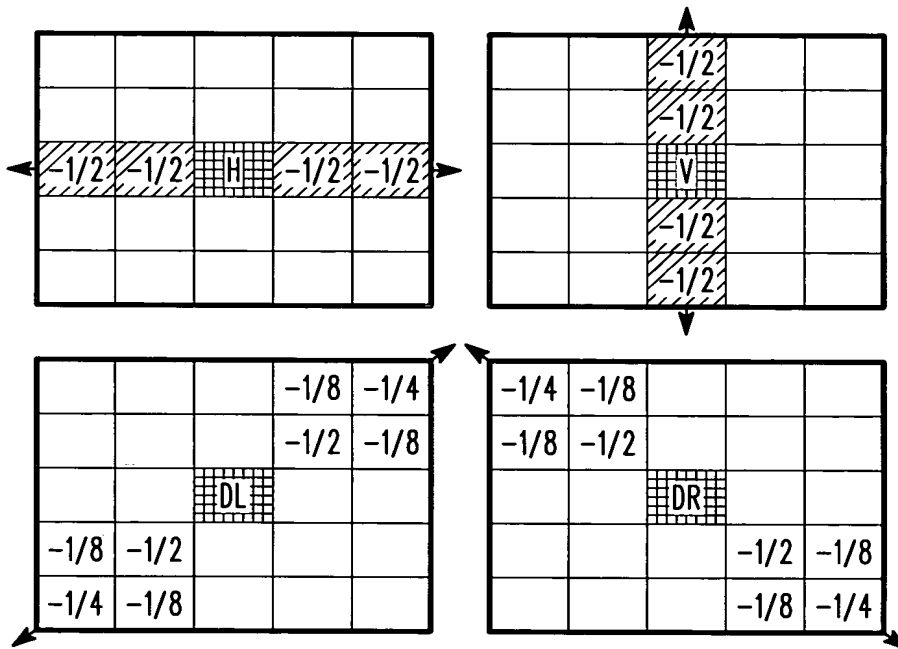


*FIG. 20*

12/21



*FIG. 21*



*FIG. 22*

DL	DL	V	DR	DR
DL	DL	V	DR	DR
H	H	MID	H	H
DR	DR	V	DL	DL
DR	DR	V	DL	DL

-1/4	-1/8	-1/2	-1/8	-1/4
-1/8	-1/2	-1/2	-1/2	-1/8
-1/2	-1/2	MID	-1/2	-1/2
-1/8	-1/2	-1/2	-1/2	-1/8
-1/4	-1/8	-1/2	-1/8	-1/4

*FIG. 23*

13/21

INDEX	NAME	ANGEL (DEGREES)	$\Delta x1, \Delta y1$	$\Delta x2, \Delta y2$
1	HORIZONTAL (H)	0, 180	$\pm 1, 0$	$\pm 2, 0$
2	DIAGONAL LEFT (DL)	45, -135	$\pm 1, \pm 1$	$\pm 2, \pm 2$
3	VERTICAL (V)	$\pm 90$	$0, \pm 1$	$0, \pm 2$
4	DIAGONAL RIGHT (DR)	135, -45	$\mp 1, \mp 1$	$\mp 2, \mp 2$
5	LESSER ANGLE LEFT (LL)	$\sim (+27), \sim (-153)$	$\pm 1, \pm 1/2$	$\pm 2, \pm 1$
6	LESSER ANGLE RIGHT (LR)	$\sim (-27), \sim (+153)$	$\mp 1, \mp 1/2$	$\mp 2, \mp 1$
7	GREATER ANGLE LEFT (GL)	$\sim (+63), \sim (-117)$	$\pm 1/2, \pm 1$	$\pm 1, \pm 2$
8	GREATER ANGLE RIGHT (GR)	$\sim (+117), \sim (-63)$	$\mp 1/2, \mp 1$	$\mp 1, \mp 2$

FIG. 24

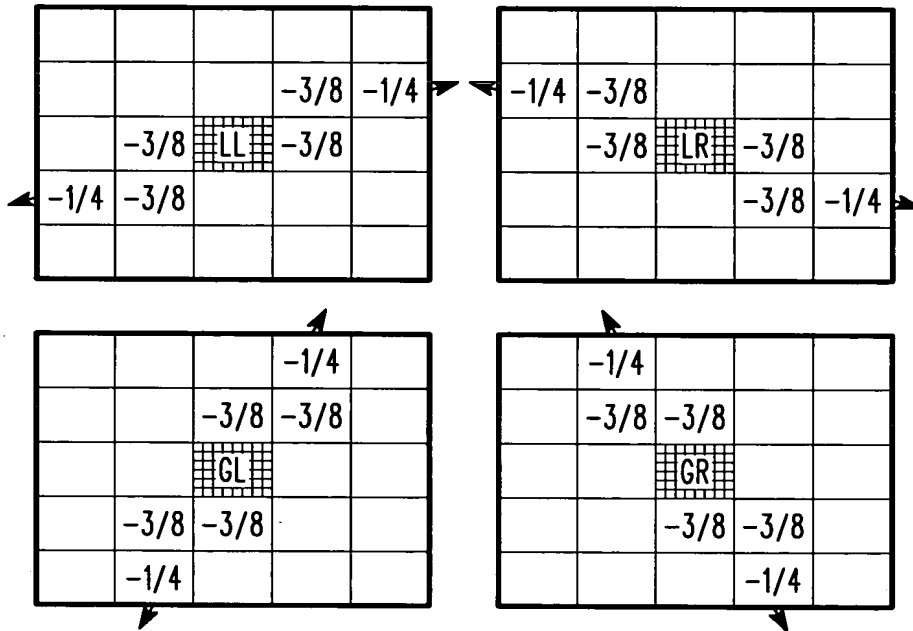


FIG. 25

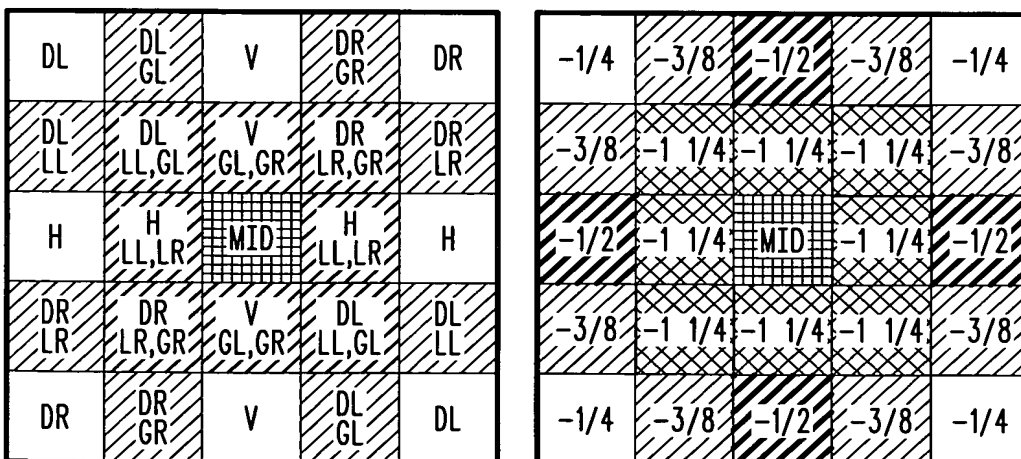


FIG. 26

14/21

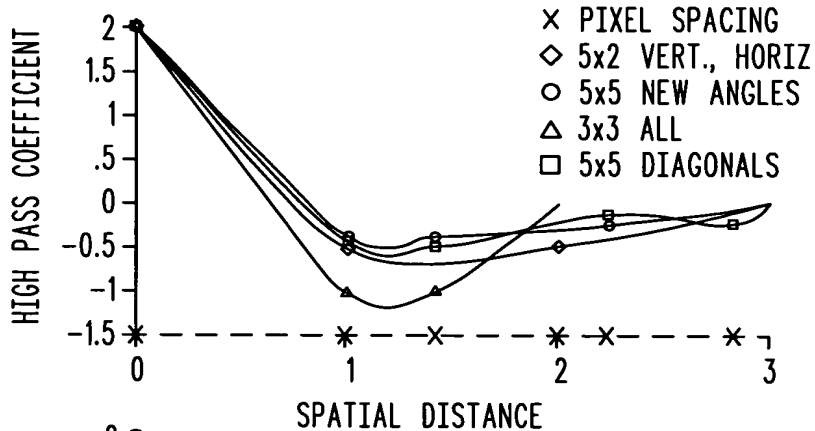


FIG. 37

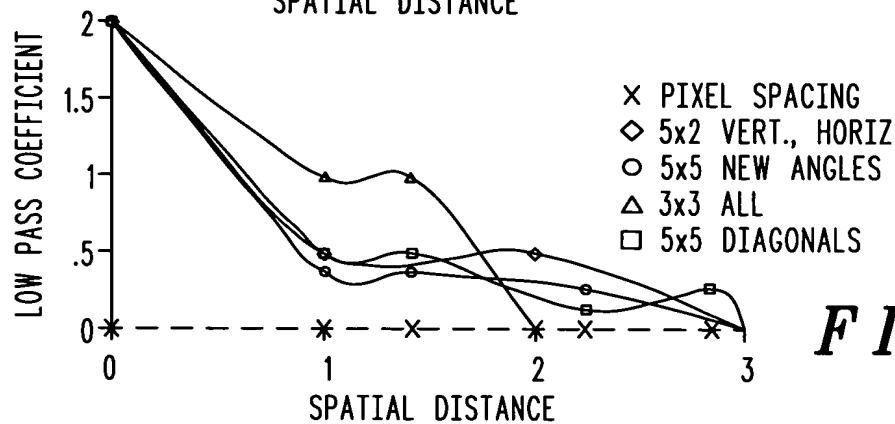


FIG. 28

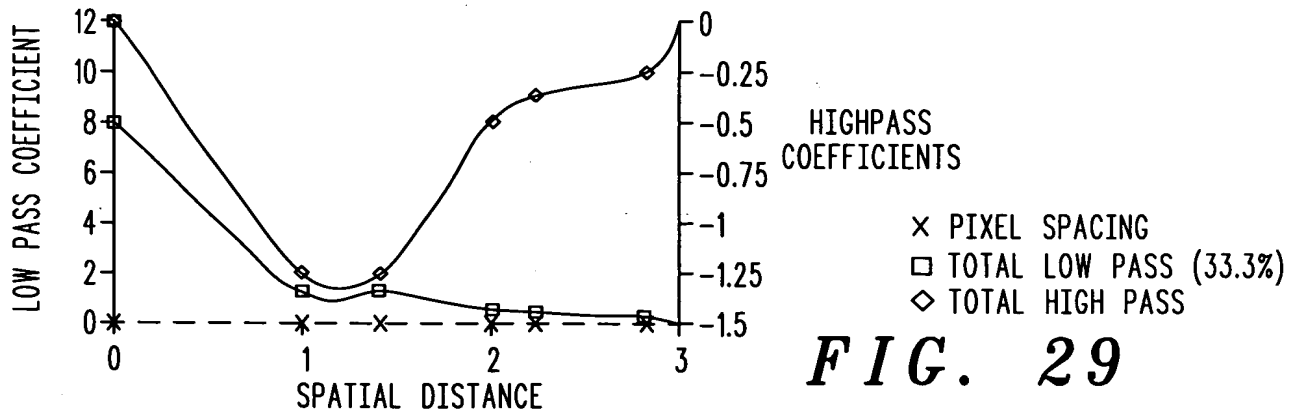


FIG. 29

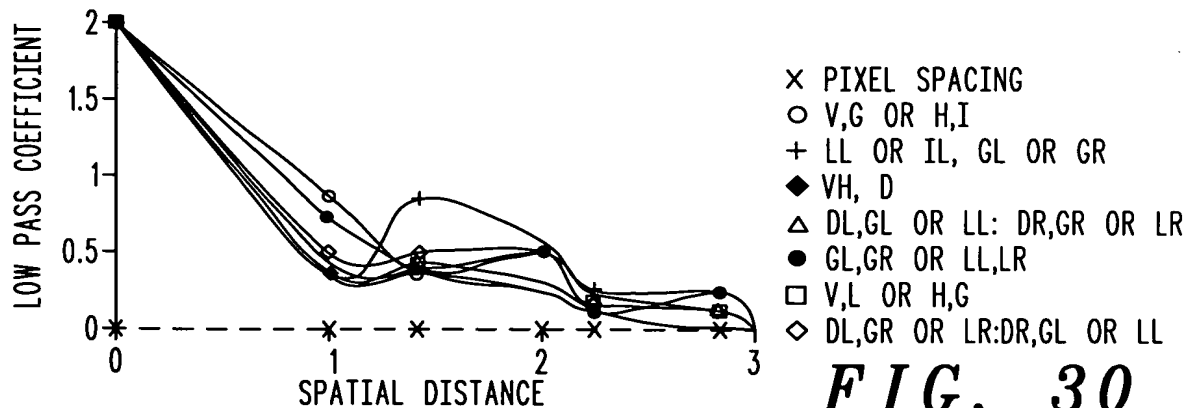


FIG. 30

C1	C0	B3	B2	B1	B0	A3	A2	3102
C1	C0	B3	B2	B1	B0	A3	A2	3104
C1	C0	B3	B2	B1	B0	A3	A2	3106
C1	C0	B3	B2	B1	B0	A3	A2	3108
C1	C0	B3	B2	B1	B0	A3	A2	3110

**FIG. 31**

ROW i	C1	C0	B3	B2	B1	B0	A3	A2
ROW i+1	C1	C0	B3	B2	B1	B0	A3	A2
ROW i+2	C1	C0	B3	B2	B1	B0	A3	A2

D1	D0	C3	C2	C1	C0	B3	B2
D1	D0	C3	C2	C1	C0	B3	B2
D1	D0	C3	C2	C1	C0	B3	B2

COLUMN 3
COLUMN 2

**FIG. 32**

M1

DON'T CARE				B1	B0	A3	A2
DON'T CARE		B3	B2	B1	B0	A3	A2
C1	C0	B3	B2	B1	B0	A3	A2

M1= \_M\_PINSRW(M1, P1(i,j).W[1],2)

M1= \_M\_PINSRW(M1, P1(i,j+1).W[0],3)

M2

DON'T CARE				B1	B0	A3	A2
DON'T CARE		B3	B2	B1	B0	A3	A2
C1	C0	B3	B2	B1	B0	A3	A2

M2= \_M\_PINSRW(M2, P2(i+1,j).W[1],2)

M3

DON'T CARE				B1	B0	A3	A2
DON'T CARE		B3	B2	B1	B0	A3	A2
C1	C0	B3	B2	B1	B0	A3	A2

M3= \_M\_PINSRW(M3, P3(i+2,j).W[1],2)

**FIG. 33**

16/21

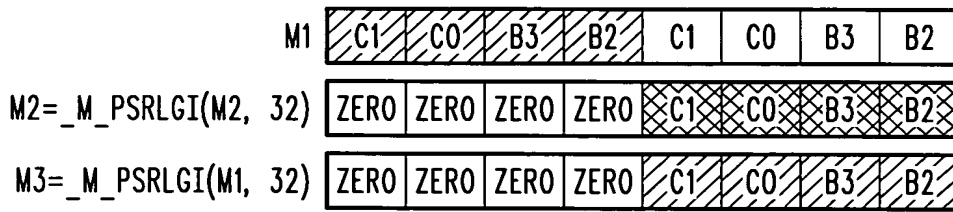


FIG. 34

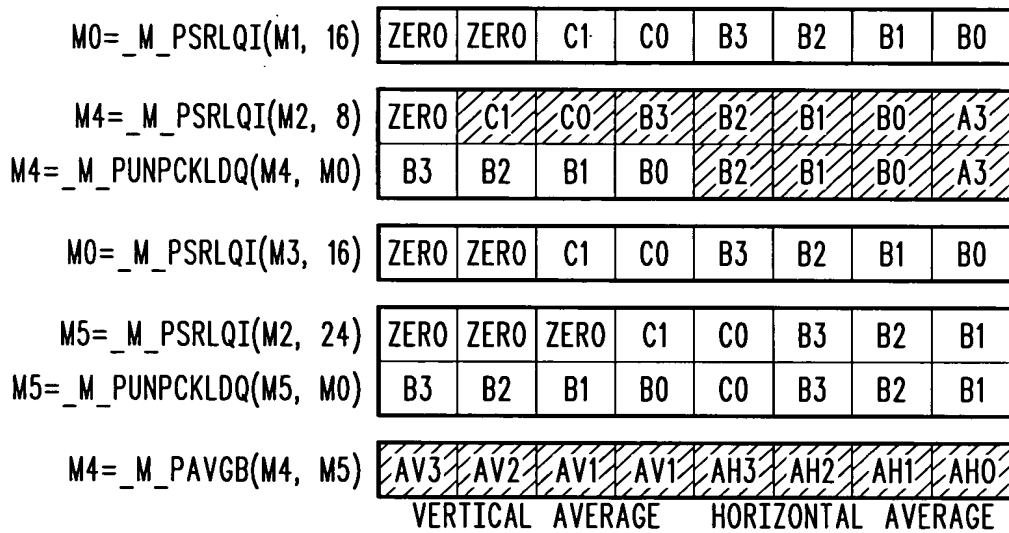


FIG. 35

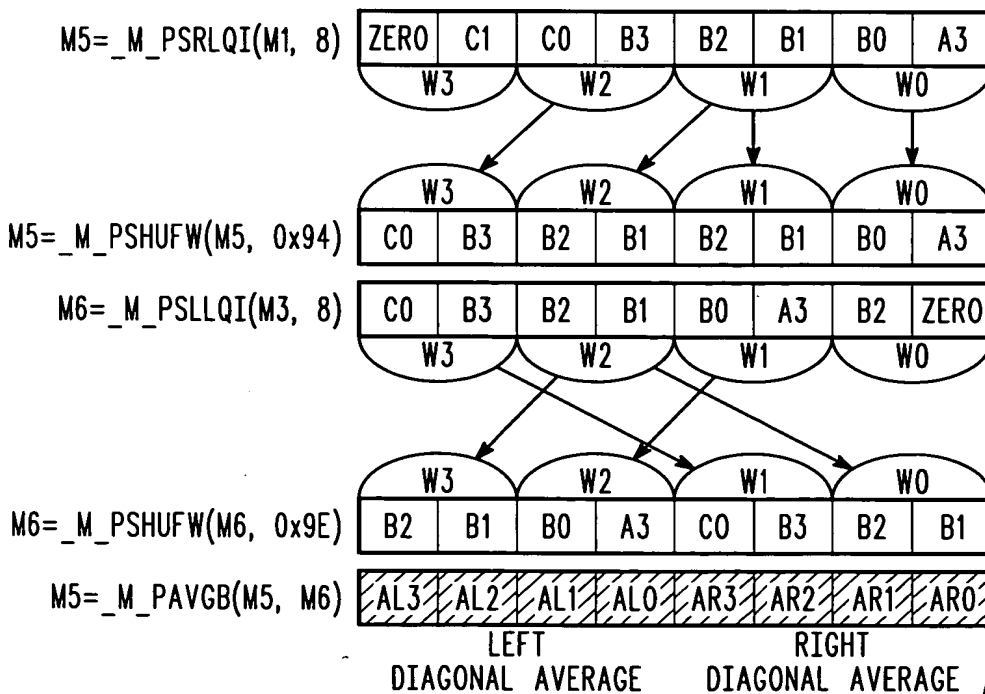
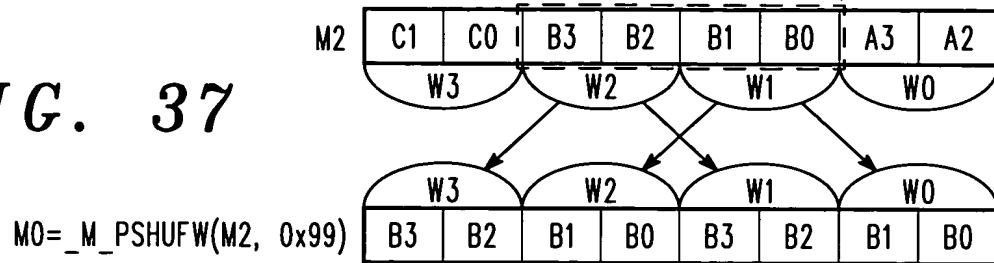


FIG. 36

17/21

FIG. 37



M6 = \_M\_PMINUB(M0, M4)

NV3	NV2	NV1	NV0	NH3	NH2	NH1	NH0
-----	-----	-----	-----	-----	-----	-----	-----

M4 = \_M\_PMAXUB(M0, M4)

XV3	XV2	XV1	XV0	XH3	XH2	XH1	XH0
-----	-----	-----	-----	-----	-----	-----	-----

M4 = \_M\_PSUBUSB(M4, M6)

V3	V2	V1	V0	H3	H2	H1	H0
----	----	----	----	----	----	----	----

ABS VERTICAL HP      ABS HORIZONTAL HP

SGNVH = \_M\_PCMPEQB(M0, M6)

SV3	SV2	SV1	SV0	SH3	SH2	SH1	SH0
-----	-----	-----	-----	-----	-----	-----	-----

VERTICAL HP SIGNS      HORIZONTAL HP SIGNS

FIG. 38

M7 = \_M\_PMINUB(M0, M5)

NL3	NL2	NL1	NL0	NR3	NR2	NR1	NR0
-----	-----	-----	-----	-----	-----	-----	-----

M5 = \_M\_PMAXUB(M0, M5)

XL3	XL2	XL1	XL0	XR3	XR2	XR1	XR0
-----	-----	-----	-----	-----	-----	-----	-----

M5 = \_M\_PSUBUSB(M5, M7)

L3	L2	L1	L0	R3	R2	R1	R0
----	----	----	----	----	----	----	----

ABS LEFT  
DIAGONAL HP

ABS RIGHT  
DIAGONAL HP

SGNLR = \_M\_PCMPEQB(M0, M7)

SL3	SL2	SL1	SL0	SR3	SR2	SR1	SR0
-----	-----	-----	-----	-----	-----	-----	-----

LEFT DIAGONAL  
HP SIGNS

RIGHT DIAGONAL  
HP SIGNS

FIG. 39

18/21

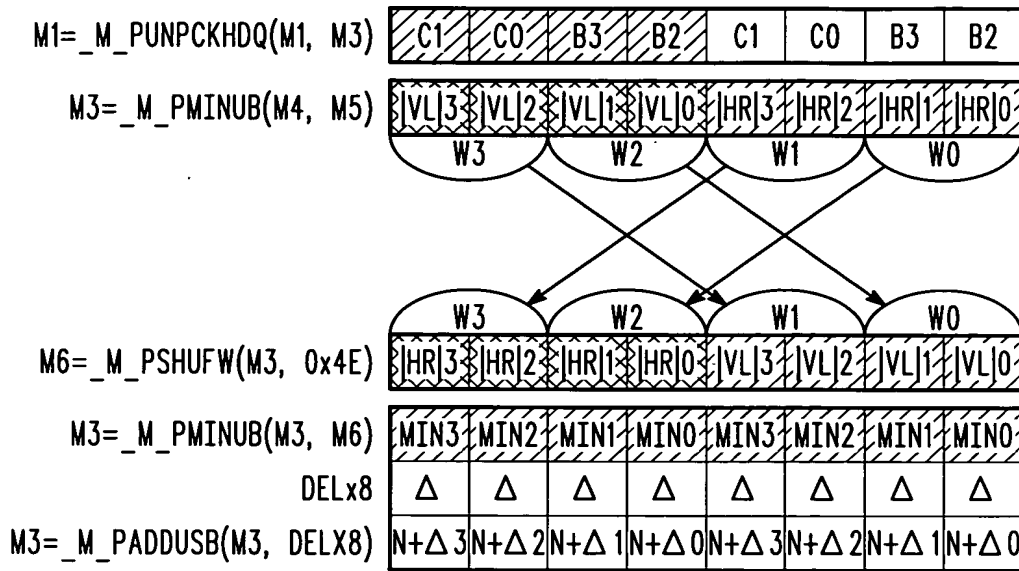


FIG. 40

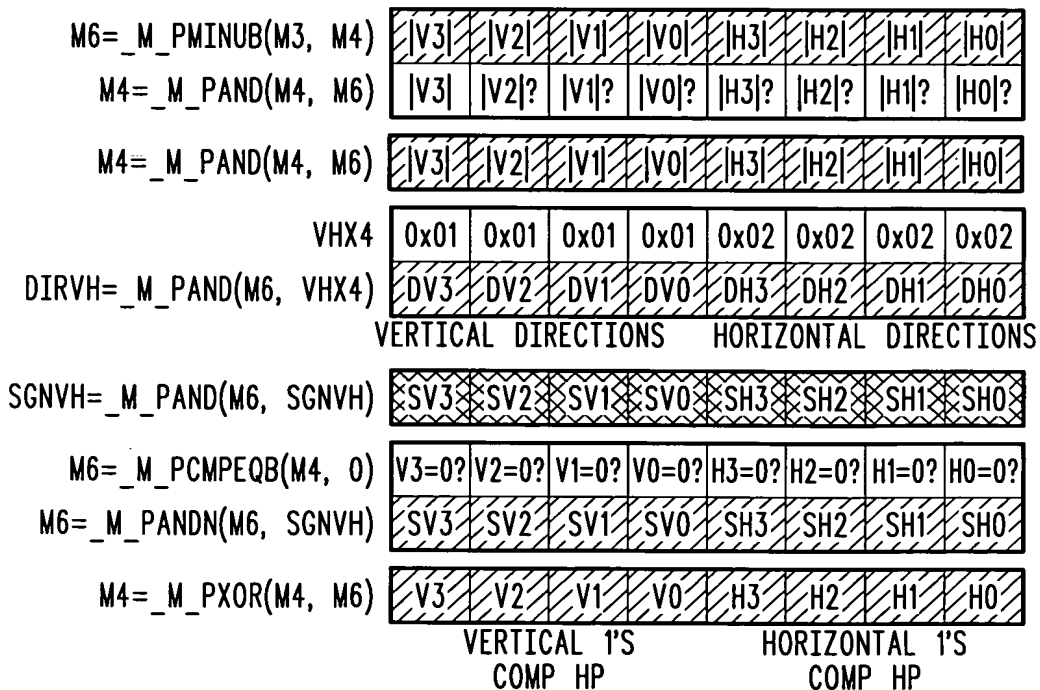


FIG. 41

19/21

M0=_M_PUNPCKLBW(M0, 0)	ZERO	B3	ZERO	B2	ZERO	B1	ZERO	B0
M0=_M_PSLLWI(M0, 2)	ZERO	4B3	ZERO	4B2	ZERO	4B1	ZERO	4B0
M3=_M_PUNPCKHBW(M4, M6)	SV3	V3	SV2	V2	SV1	V1	SV0	V0
M0=_M_PSUBUSW(M0, M3)	4B3-V3	4B3-V2	4B3-V1	4B3-V0				
M3=_M_PUNPCKLBW(M4, M6)	SH3	H3	SH2	H2	SH1	H1	SH0	H0
M0=_M_PSUBSW(M0, M3)	4B3-VH3	4B3-VH2	4B3-VH1	4B3-VH0				
M3=_M_PUNPCKHBW(M5, M7)	SL3	L3	SL2	L2	SL1	L1	SL0	L0
M0=_M_PSUBUSW(M0, M3)	4B3-VHL3	4B3-VHL2	4B3-VHL1	4B3-VHL0				
M3=_M_PUNPCKLBW(M5, M3)	SR3	R3	SR2	R2	SR1	R1	SR0	R0
M0=_M_PSUBUSW(M0, M3)	4B3-VHLR3	4B3-VHLR2	4B3-VHLR1	4B3-VHLR0				

FIG. 42

M7=_M_PADDB(M6, M7)	SVL3	SVL2	SVL1	SVL0	SHR3	SHR2	SHR1	SHR0
M3=_M_PSLLQI(M7, 32)	SHR3	SHR2	SHR1	SHR0	ZERO	ZERO	ZERO	ZERO
M3=_M_PADDB(M3, M7)	STOT3	STOT2	STOT1	STOT0	SHR3	SHR2	SHR1	SHR0
FFX4	0xFF	0xFF	0xFF	0xFF	0x00	0x00	0x00	0x00
M3=_M_PXOR(M3, FFX4)	STOT3	STOT2	STOT1	STOT0	SHR3	SHR2	SHR1	SHR0
TOT HP SIGNS=1'S COMP								
ONEX	0x01	0x01	0x01	0x01	0x00	0x00	0x00	0x00
M3=_M_PADDB(M3, ONEX4)	STOT3	STOT2	STOT1	STOT0				
TOT HP SIGNS 2'S COMP								
M3=_M_PUNPCKHBW(M3, 0)	ZERO	STOT3	ZERO	STOT2	ZERO	STOT1	ZERO	STOT0
M0=_M_PSUBSW(M0, M3)	4LPFB3	4LPFB2	4LPFB1	4LPFB0				

FIG. 43

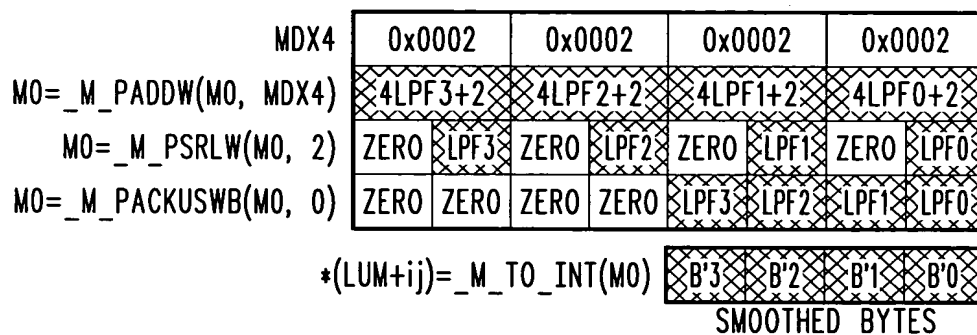


FIG. 44

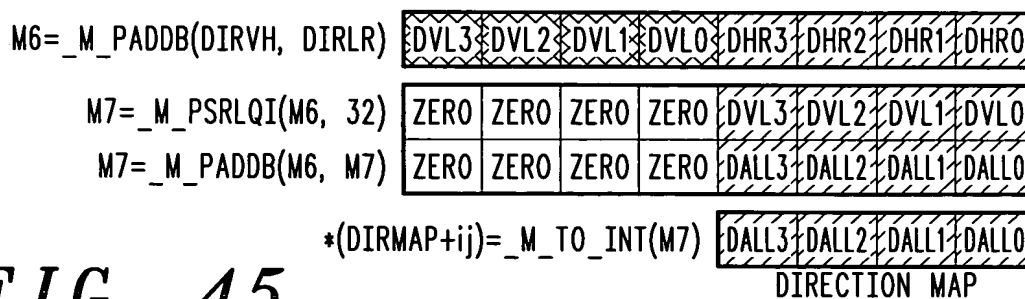


FIG. 45

21/21

D=1				
HIGH-PASS				
0	0	-4	0	0
0	0	-4	0	0
0	0	16	0	0
0	0	-4	0	0
0	0	-4	0	0
LOW-PASS (87.5%)				
0	0	4	0	0
0	0	4	0	0
0	0	112	0	0
0	0	4	0	0
0	0	4	0	0

D=2				
HIGH-PASS				
0	0	-4	0	0
0	0	-4	0	0
-4	-4	32	-4	-4
0	0	-4	0	0
0	0	-4	0	0
LOW-PASS (75%)				
0	0	4	0	0
0	0	4	0	0
4	4	96	4	4
0	0	4	0	0
0	0	4	0	0

D=3				
HIGH-PASS				
0	0	-4	-1	-2
0	0	-4	-4	-1
-4	-4	48	-4	-4
-1	-4	-4	0	0
-2	-1	-4	0	0
LOW-PASS (62.5%)				
0	0	4	1	2
0	0	4	4	1
4	4	80	4	4
1	4	4	0	0
2	1	4	0	0

D=4				
HIGH-PASS				
-2	-1	-4	-1	-2
-1	-4	-4	-4	-1
-4	-4	64	-4	-4
-1	-4	-4	-4	-1
-2	-1	-4	-1	-2
LOW-PASS (50%)				
2	1	4	1	2
1	4	4	4	1
4	4	64	4	4
1	4	4	4	1
2	1	4	1	2

D=5				
HIGH-PASS				
-2	-1	-4	-1	-2
-1	-4	-4	-7	-3
-4	-7	80	-7	-4
-3	-7	-4	-4	-1
-2	-1	-4	-1	-2
LOW-PASS (37.5%)				
2	1	4	1	2
1	4	4	7	3
4	7	48	7	4
3	7	4	4	1
2	1	4	1	2

D=6				
HIGH-PASS				
-2	-1	-4	-1	-2
-3	-7	-4	-7	-3
-4	-10	96	-10	-4
-3	-7	-4	-7	-3
-2	-1	-4	-1	-2
LOW-PASS (25%)				
2	1	4	1	2
3	7	4	7	3
4	10	32	10	4
3	7	4	7	3
2	1	4	1	2

D=7				
HIGH-PASS				
-2	-1	-4	-3	-2
-3	-7	-7	-10	-3
-4	-10	112	-10	-4
-3	-10	-7	-7	-3
-2	-3	-4	-1	-2
LOW-PASS (12.5%)				
2	1	4	3	2
3	7	7	10	3
4	10	16	10	4
3	10	7	7	3
2	3	4	1	2

D=8				
HIGH-PASS				
-2	-3	-4	-3	-2
-3	-10	-10	-10	-3
-4	-10	128	-10	-4
-3	-10	-7	-10	-6
-2	-3	-4	-3	-2
LOW-PASS (0%)				
2	3	4	3	2
3	10	10	10	3
4	10	0	10	4
3	10	7	10	6
2	3	4	3	2

**FIG. 46**